digigram

VX820HR, VX822HR
VX820e, VX822e

Professional Multichannel
Sound Cards

User manual

For technical support,
please contact your system supplier.

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VX820HR, VX822HR, VX820e, & VX822e

User Manual

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DU-19800101-IS-04

INFORMATION FOR THE USER

This device complies with part 15 of FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.
This equipment has been tested and found to comply with the limits for a CLASS B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions contained in this data sheet, may cause harmful interference to radio and television communications. However, there is no guarantee that interference will not occur in a particular installation.
If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
* reorient or relocate the receiving antenna
* increase the separation between the equipment and the receiver
* connect the equipment into an outlet on a circuit different from that of the receiver
* consult the dealer or an experienced audio television technician.

Note: *Connecting this device to peripheral devices that do not comply with CLASS B requirements or using an unshielded peripheral data cable could also result in harmful interference to radio or television reception. The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. To ensure that the use of this product does not contribute to interference, it is necessary to use shielded I/O cables.*

Warning:

Electrostatic discharge (ESD) can damage several components on the board. To avoid such damage in handling the board, take the following precautions:

Bring the card and everything that contacts it to ground potential by providing a conductive surface and discharge paths. As a minimum, observe these precautions:

- *Disconnect all power and signal sources.*
- *Place the card on a grounded conductive work surface.*
- *Ground yourself via a grounding wrist strap or by holding a grounded object.*
- *Ground any tool that will contact the card.*

Due to the reduced length of the PCI EXPRESS™ bus connector and the resulting lack of mechanical stability, we strongly advise against transporting cards installed in a computer, unless its chassis or case provides a dedicated support to keep the card securely in place in order to avoid physical damage.

IMPORTANT NOTICE

This card has been tested and found to comply with the following standards:

- International: CISPR22 Class B
- Europe: EMC 89/336/CEE (1992) specifications
- United States: FCC Rules-Part 15-Class B (digital device)

In order to guarantee compliance with the above standards in an installation, the following must be done:

- the provided cable must not be modified
- additional cables used must have their respective shield connected to each extremity

CONTENTS OF THIS PACKAGE

Thank you for purchasing a Digigram VX sound card.

The package consists of the following components:

- a VX820HR, VX822HR, VX820e or VX822e sound card

The end user version additionally includes:

- cable(s)
- a CD-Rom with drivers, installation notices, FAQs, etc…

For the OEM version, the cables are available optionally.

Also available:

2U 19-inch breakout box allowing straightforward and secure connection to all the cards' I/Os

FEATURES

VX822HR and VX820HR are audio cards for PCI bus. They are 'Universal PCI 64-bit/66 MHz', which means they can be plugged in 32-bit/33 MHz 5 V PCI slots as well as in 64-bit/66 MHz 3.3 V keyed PCI slots. The cards are also compatible with PCI-X interfaces.

VX820e and VX822e are audio cards for PCI EXPRESS™ (PCIe®) bus. They are in PCI EXPRESS™ x1 format and can thus be plugged into any PCIe® slot (x1, x2, x4, x8, x16, x32).

VX820HR and VX820e main hardware features

- 2 balanced** analog mono line inputs, with software programmable analog and digital gain
- 8 servo-balanced*** analog mono line outputs, with software programmable analog and digital gain
- 192 kHz / 24-bit converters
- Maximum level on analog inputs and outputs: +24 dBu

VX822HR and VX822e main hardware features

All features of VX820HR and VX820e, plus:

- 1 AES/EBU* stereo input, with hardware sample rate converters (up to 192 kHz on VX822e, 96 kHz on VX822HR)
- 4 AES/EBU* stereo outputs (up to 192 kHz)
- 1 AES/EBU* stereo sync input (up to 192 kHz)
- 1 standard Word Clock input (up to 96 kHz)
- 1 standard Word Clock output (up to 96 kHz)
- 1 video sync input
- 1 SMPTE/LTC (Linear Time Code) input

** *can be used with unbalanced signals*

*** *Electronically servo-balanced outputs provide automatic level adjustment to accommodate either balanced or unbalanced lines*

* *can be used as S/PDIF interface as well*

Main software features

- Real-time, simultaneous PCM record and playback (8, 16 and 24 bits), Float IEEE754 (with 24-bit fixed-point dynamic range)
- When using the np SDK, real-time mixing of several PCM audio streams, direct monitoring, level adjustment, panning, cross-fades, punch-in/punch-out, scrubbing
- Low latency DirectSound, Wave*, and ASIO drivers

Note: *the HR Runtime package for Windows Vista does not include a Wave driver. In case your audio application explicitly requires a Wave interface, a Wave driver is available on request. In this case, please contact Digigram.*

REQUIREMENTS

Minimum hardware requirements

VX820HR and VX822HR:
PC with one free PCI or PCI-X slot (5 V or 3.3 V).

VX820e and VX822e:
PCI EXPRESS™ (PCIe®) slot (x1, x2, x4, x8, x16 or x32)

CPU power and memory required depend on the operating system and on the audio application used.

Software requirements

To use your VX820HR/e or VX822HR/e, install the driver from the HR Runtime package version 1.72 or higher. This package includes:

- a Digigram np driver enabling OEM applications to best capitalize on the boards
- a WDM DirectSound driver
- a Wave driver* (32 bits, installation optional)
- an ASIO driver (32 bits, installation optional)

Supported operating systems

VX820HR/e and VX822HR/e cards run under Windows XP, Windows Server 2003, Windows Vista, Windows Server 2008, and Windows 7.

* *Windows XP and Server 2003 only*

HARDWARE INSTALLATION

Due to the reduced length of the PCI EXPRESS™ bus connector and the resulting lack of mechanical stability, we strongly advise against transporting the PCI EXPRESS™ card(s) installed in a computer, unless its chassis or case provides a dedicated support to keep the card securely in place in order to avoid physical damage.

The card has to be installed in the computer prior to installing its driver.

Installing the card

Gently plug the card in a free PCI slot and press it down to position it firmly. Tighten the screw.

Interrupt and memory address

Hardware interrupt and addresses are automatically set up at start-up by the PCI PnP BIOS.

SOFTWARE INSTALLATION

Note: *the installation of the software requires administrator rights on your computer*

Please visit the Digigram web site at **www.digigram.com** for the most recent driver.

In case you run a specific application developed or installed by a Digigram Partner, this application might require the use of a specific driver version. In this case, make sure that the updated driver has been approved by your supplier.

Important note*: this default procedure installs the 'Digigram Hardware Settings' control panel. This application allows the configuration of the hardware resources of Digigram cards for all audio applications. The DHS allows for instance to define the clock of the card, the input source, input and output analog and digital gain, Sample Rate Converters, digital output format, etc...*

Please note that, with the DHS installed, controls available through the DirectSound control panel are limited to:

- *Volume control for input and output*

- *Wave control*

Under Windows XP and Server 2003 you may also install the driver without installing the DHS control panel, and in this case more controls are available through the DirectSound control panel:

- *Volume control for input*
- *Wave control*
- *Monitoring control*
- *Analog input level*
- *Digital input level*
- *Clock selection: AES Sync, AES1, Word Clock*
- *Digital output format: professional, consumer*

*To do so, install the driver with the command line: "**setup x_topology**" (not available under Windows Vista). For detailed information, please refer to the dedicated document on our web site.*

Standard installation under Windows XP, Windows Server 2003, Windows Vista, Windows Server 2008, and Windows 7

If the driver has been downloaded from our web site, it has to be expanded prior to the driver's installation as follows: double-click on the downloaded file (self-expanding). You can use the default destination location (Windows temporary folder) or select another directory.

- Shut down your computer and insert your VX card.
- Restart your computer.
- Click on **Cancel** if the **Found New Hardware Wizard** appears.
- Double-click on the **HR Runtime vxx.msi/HR Runtime vxx.msi for Vista** icon to launch the driver installation.
- A welcome message is displayed, click **Next** to continue.
- The "**License Agreement**" window appears: read it, and click on ***"I accept the terms in the license agreement"*** to approve it.
- Do the same in the next window for Virtual PCX and PC Codec Legal Notice.
- In the **"Custom Setup"** window, the "*Drivers for the HR boards*" are ***displayed***; by default, both WDM DirectSound and ASIO HR are installed.

To install the Wave driver*, select '**Wave**'.
To be able to use your VX card through np, select the '**Digigram np**' component option *(or make sure that the np application explicitly sets the 'VX_FLAG' with PCXInitialize())*.
Next.

- In the "Ready to Install the Program" window, click on Install to start copying the files.
  - *__Note:__ In case the driver version is unsigned, the "Digital Signature Not Found" message may appear because a non-Microsoft software is about to be installed.*
    *Click on **Continue** in the **"Hardware installation"** window (Windows XP, Server 2003).*
- *Under Windows Vista:*
  *Click **Allow** in the "**User Account Control**" window.*
  *Click **Install** in the "**Windows Security**" window.*
- In the **"Digigram drivers"** window, select the number and the size of buffers required by your applications. Click on **Ok**.
- Click **Finish** to complete the driver installation.

ASIO Control Panel

__Note__: for most current ASIO/Wave applications (e.g. Cubase, Nuendo, WinAmp, etc...) you have the choice between a 32-bit version and a 64-bit version when installing them under Windows ≥ Vista. For operation with your sound card, make sure to use the 32-bit version!

To launch the ASIO control panel, go to **<Start>**, **<Programs>**, **<Digigram>**, **<Digigram ASIO HE Settings>**.

It allows to:

- set/modify the size of ASIO buffers (and thus latency)
- select the number of bits per sample (16 or 24)
- select the LTC frame rate
- select the I/O used
- enable/disable the hardware monitoring control

For more information on this ASIO control panel, to refer to its online help.

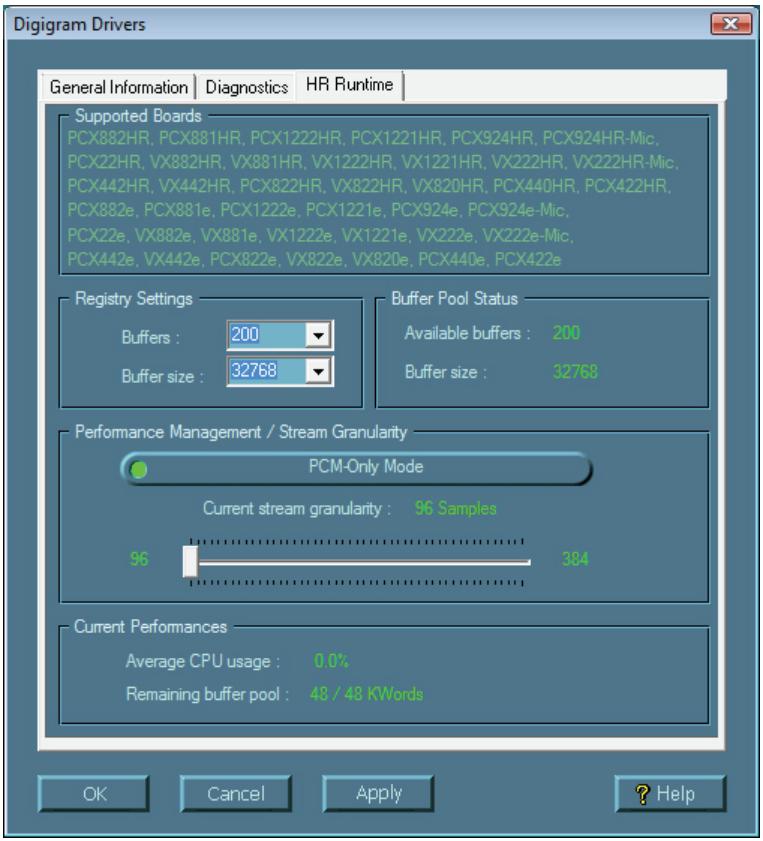
* *Windows XP and Server 2003 only; for Windows Vista, a Wave driver is available on request.*

Digigram Control Center

This control panel allows to define:

- the number of buffers and their size
- the granularity

Please note that for all sound cards of the VX range, **"PCM only"** is the only operating mode, therefore this button is not functional in the Digigram control panel (CPL). (To access this control panel, go to **<Start>**, **<Programs>**, **<Digigram>**, **<Digigram Control Center>**). For detailed information on how to use the Digigram control panel, please refer to its online help (**"? Help"** button).



Removing the driver under Windows XP and Windows Server 2003

- Open the **Windows Control Panel** and double-click on the **Add/Remove Software** icon.
- Select ***"Digigram HR Runtime …"***, and **Change/Remove**.
- Select **Remove** in the HR Runtime window.
- Follow the instructions to finish the driver removal.

Removing the driver under Windows Vista, Windows Server 2008, and Windows 7

- Open the **Windows Control Panel** and double-click on the **Programs and Features** icon.
- Select ***"Digigram HR Runtime for Vista…"***, and **Change/Remove**.
- Select **Remove** in the HR Runtime window.
- Follow the instructions to finish removing the driver.

How to check the installation

Once the cards and the driver have been installed according to the procedure described in this manual, you can verify that the card is properly installed and works fine as follows:

- Menu **<Start> <Settings> <Control panel>**, **<Sound and Multimedia>**, tab **"Audio"**, **Default device** (Playback device, Recording device). The card's channels can be selected. The card can be used with any *DirectSound* application.

  Available WDM recording and playback devices are:
  - VX820HR/e (VX822HR/e) 1+2 (WDM) (*record and playback*)
  - VX820HR/e (VX822HR/e) 3+4 (WDM) (*playback*)
  - VX820HR/e (VX822HR/e) 5+6 (WDM) (*playback*)
  - VX820HR/e (VX822HR/e) 7+8 (WDM) (*playback*)
  - VX820HR/e (VX822HR/e) 5.1 (WDM) (*playback*)
  - VX820HR/e (VX822HR/e) 7.1 (WDM) (*playback*)
- The card is also visible via the np interface: go to **<Start> <Programs> <Digigram>** and select **<Digigram Control Center>**.
  - In the **"Digigram drivers"** window, select the '**General Information**' tab.
    In the **"Modules Information"** window, you can see the **HR Runtime** modules that have been installed, and their versions.
  - In the **"Digigram drivers"** window, select the **'Diagnostics'** tab. You should see here the icons of the cards you have installed.

- If the card you have installed is listed:
  - Right click on the icon of the card.
  - Select **'Diagnostics'**, and ***Play Sine***. This plays in loop a sine signal on the outputs of the card. You can also select ***Play file*** to play in loop a file of your choice (PCM only). If the playback is correct, the card is correctly installed and works.
  - To stop the playback, right click on the card icon, and select ***Stop Activities***.
- If the card is not displayed:
  - Make sure that during the HR Runtime installation the **"Driver for the HR boards"** has been selected in the **"Select components"** window.
  - Make sure that the card is correctly inserted in the PCI slot, and screwed on the PC chassis.
  - If necessary, uninstall the HR Runtime package as described in this manual, and re-install it.
- If the Wave driver has been installed*:
  - Go to menu **<Start>**, **<Settings>**, **<Control panel>**, **<Sound and Multimedia>**, tab "**Audio**", **Default device** (**Playback device, Recording device**). The card's channels can be selected. The card can be used with any Wave application.
    Available Wave recording and playback devices are:
    - VX820HR/e (VX822HR/e) 1+2 (Wave) (*record and playback*)
    - VX820HR/e (VX822HR/e) 3+4 (Wave) (*playback*)
    - VX820HR/e (VX822HR/e) 5+6 (Wave) (*playback*)
    - VX820HR/e (VX822HR/e) 7+8 (Wave) (*playback*)
    - VX820HR/e (VX822HR/e) 5.1 (Wave) (*playback*)
    - VX820HR/e (VX822HR/e) 7.1 (Wave) (*playback*)
    - VX820HR/e (VX822HR/e) 5.1+2 (Wave) (*playback*)
- If the ASIO driver has been installed:
  - The card is visible from any ASIO application.

Note:
5.1 plays on outputs 1, 2, 3, 4, 5, 6
7.1 plays on outputs 1, 2, 3, 4, 5, 6, 7, 8
5.1+2 plays on outputs 1, 2, 3, 4, 5, 6, 7, 8

* *Windows XP and Server 2003 only; for Vista, a Wave driver is available on request.*

The 'Digigram Hardware Settings' ('DHS') control panel

Digigram hardware settings (DHS) is an application allowing to configure the hardware resources of Digigram cards for all audio applications using them.
A resource being managed by the DHS application can not be modified by any other application. To enable an audio application to modify a Digigram card resource, this resource must not be managed by the DHS.

Note: As soon as a resource of a card is managed by the DHS, the clock selection of this card MUST be defined in the DHS.

The DHS allows to:

- Select the clock the card uses
- Select the input source
- Set analog and digital gains of an input
- Enable Sample Rate Converters of an input
- Select the input monitored on an output
- Set the monitoring gains
- Set the analog and digital gains of an output
- Define the digital output format

For help on how to use this control panel, please refer to its on-line help.

SPECIFICATIONS

Configuration

	VX820HR VX822HR	VX820e VX822e
Bus/Format	64-bit/66 Mhz Universal PCI 2.2, PCI-X compatible, master mode	PCI ExpressTM (PCIe®) x1 (x2, x4, x8, x16, x32 compatible)
Digital Signal Processor	Motorola 56321 at 240 MHz	
RAM	512 kWords	
Size	175 mm × 99 mm x 20 mm	168 mm × 111 mm x 20 mm
Power requirements (+3.3V/+5V / +12V / –12V)	0 A / 1.8 A / 0.1 A / 0.1 A	3 A / 0 A / 0.4 A / 0 A
Operating: temp / humidity (non-condensing)	0°C/+50°C • 5%/90%	
Storage: temp / humidity (non-condensing)	-5°C/+70°C • 0%/95%	

Inputs

	VX820HR VX822HR	VX820e VX822e
Analog line inputs (mono)	2 balanced*	
Maximum input level/ impedance	+24 dBu/ >10 kΩ	
Digital input (stereo) *(not available on VX820HR/e)*	1 AES/EBU** with hw Sample Rate Converter, ratio from 1:3 to 3:1, up to 96 kHz	1 AES/EBU** with hw Sample Rate Converter, ratio from 7.5:3 to 8:1, up to 192 kHz
Programmable input gain	analog: from –94.5dB à +15.5 dB⊗ digital: from –110 dB à +18 dB	
Other inputs *(not available on VX820HR/e)*	AES/EBU Sync (up to 192 kHz), Word clock (up to 96 kHz), LTC, Video	
AES11 synchronization	Yes	

* *can be used with unbalanced signals*
** *can be used as S/PDIF interface as well*
⊗ *maximum sensitivity: 0 dBFs for –15.5 dBu input*

Outputs

	VX820HR VX822HR	VX820e VX822e
Analog line outputs (mono)	8 servo-balanced*	
Maximum output level / impedance	+24 dBu / <100 Ω	
Digital outputs (stereo) *(not available on VX820HR/e)*	4 AES/EBU**, up to 192 kHz	
Programmable output gain	analog: from –86 dB to +24 dB digital: from –110 dB to +18 dB	
Other outputs *(not available on VX820HR/e)*	Word clock (up to 96 kHz)	

Connectors

	VX820HR VX822HR	VX820e VX822e
Internal connectors	Inter-board Synchronization	
External connector	62-pin HD Sub-D	68-pin SCSI MDR
Digigram accessories available	Breakout cable or 2U 19" Breakout Box	

Audio specifications

	VX820HR VX822HR	VX820e VX822e
Sampling frequencies available	Programmable from 32 to 192 kHz	
A/D and D/A converter resolution	24 bits	
Supported audio formats	PCM (8, 16, 24 bits), Float IEEE754	

* *electronically servo-balanced outputs provide automatic level adjustment to accommodate either balanced or unbalanced lines*

** *can be used as S/PDIF interface as well*

Typical Audio Performance

Measurements done at Fs=48 kHz unless stated otherwise, with filter on the 22 Hz - 22 kHz range

	VX820HR VX822HR	VX820e VX822e
Frequency response (record + play)	20 Hz–20 kHz: ±0.3 dB	
Channel phase difference: 20/20kHz	<0.2°/2°	
Dynamic range (A-weighted)	Analog In: >104 dB Analog Out: >110 dB	
THD + noise 1 kHz at –2 dBfs	Analog In: <–96 dB Analog Out: <–96 dB	
THD + N 1 kHz AES/EBU In w/ SRC	<–110 dB	<–130 dB
Crosstalk (Analog in or out)	1 kHz at 24 dBu: <–100 dB 15 kHz at 24 dBu: <–90 dB	

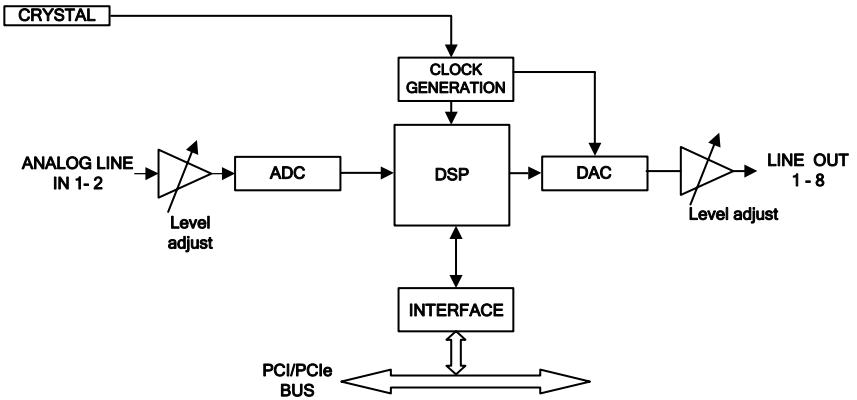
Development environments

	VX820HR VX822HR	VX820e VX822e
Digigram management	np SDK (HR Runtime, PCM only)	
Other management	Wave*, ASIO, and DirectSound (all PCM only)	
OS supported	Windows XP, Windows Server 2003, Windows Vista, Windows Server 2008, and Windows 7	
Main on-board processing features (with np SDK)	PCM and Float IEEE754, play, rec, real-time mixing, direct monitoring, level adjustment, 3-band parametric equalizer, maximizer, panning, cross-fade, punch-in/punch-out, scrubbing	

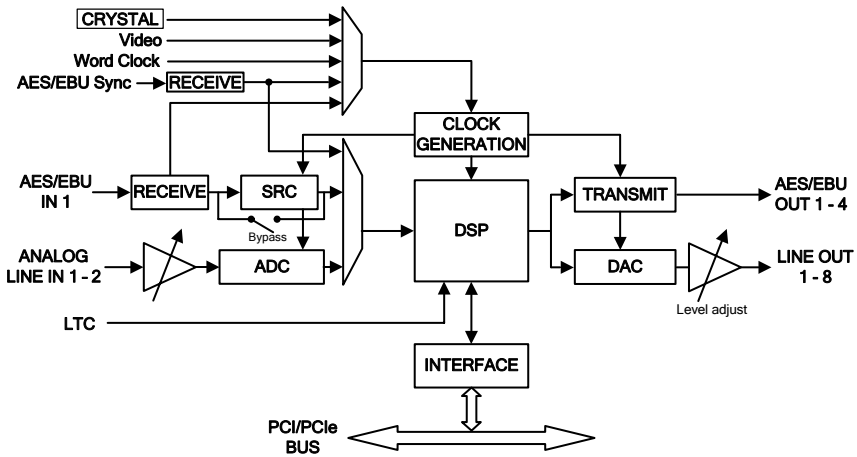
* *Windows XP and Server 2003 only; for Windows Vista, a Wave driver is available on request.*

APPENDICES

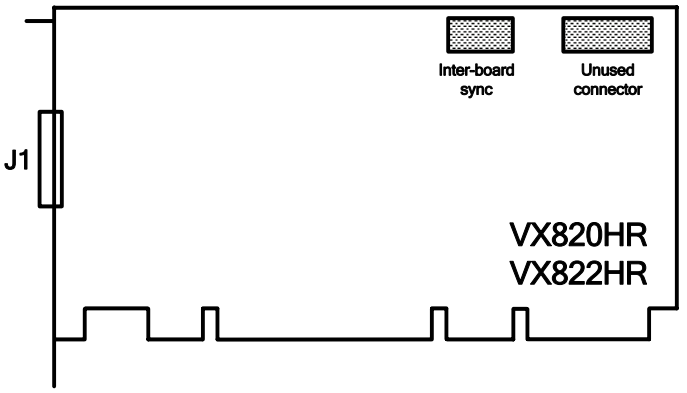
VX820HR and VX820e Schematic Diagram

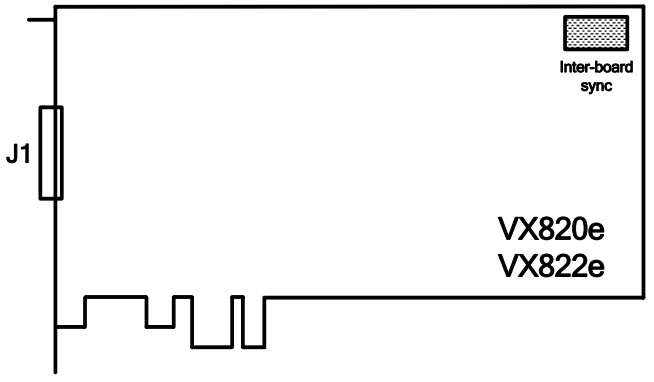


VX822HR and VX822e Schematic Diagram



LAYOUT

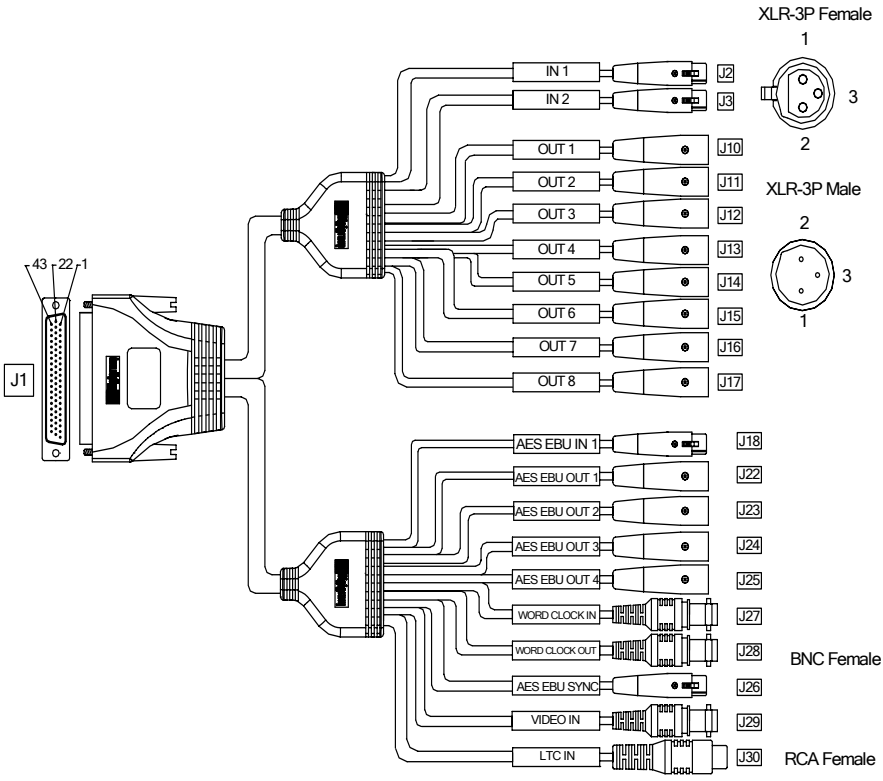




- J1: I/O connector

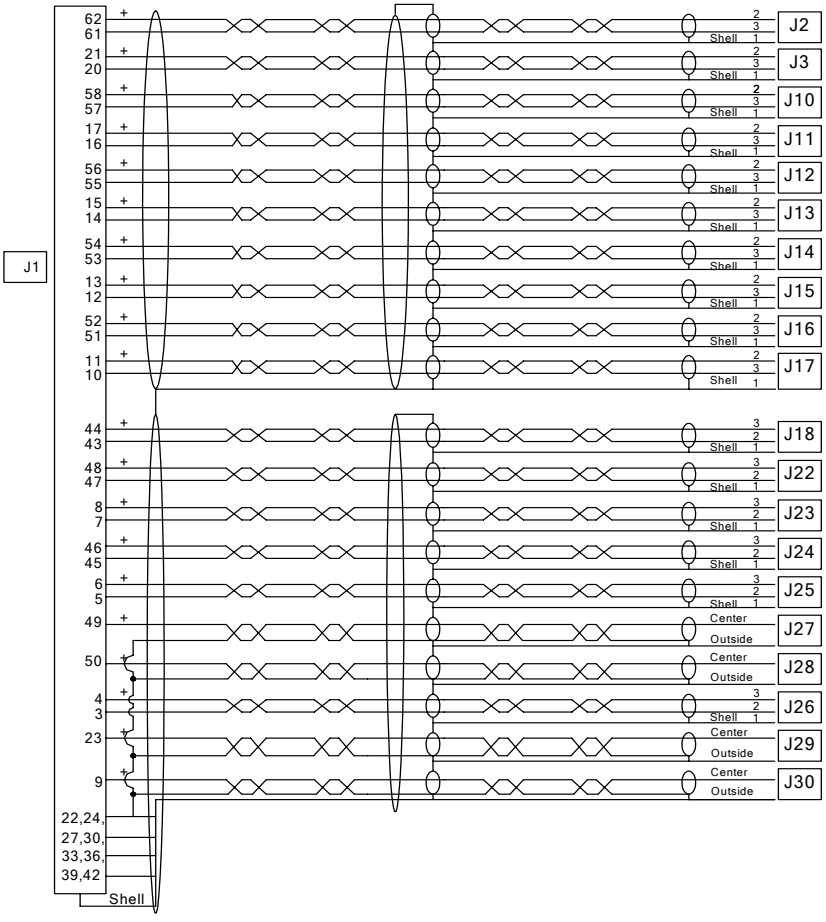
Cable diagram

Schematic diagram of the cable delivered by Digigram*:

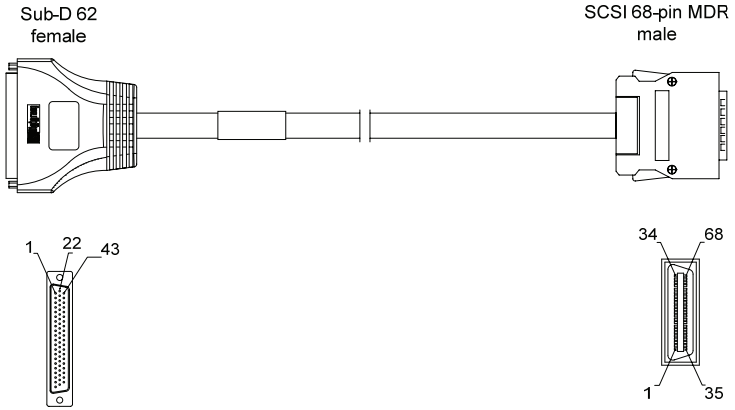


* Your cable may look different if it is not a Digigram cable.

VX822HR wiring diagram

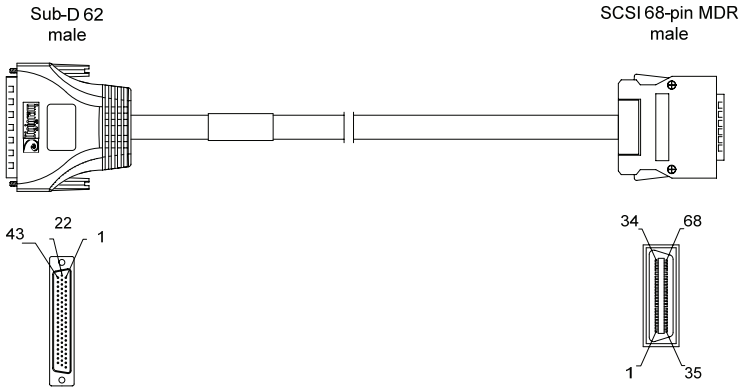


Adapter cable Sub-D 62⇔ SCSI 68 MDR

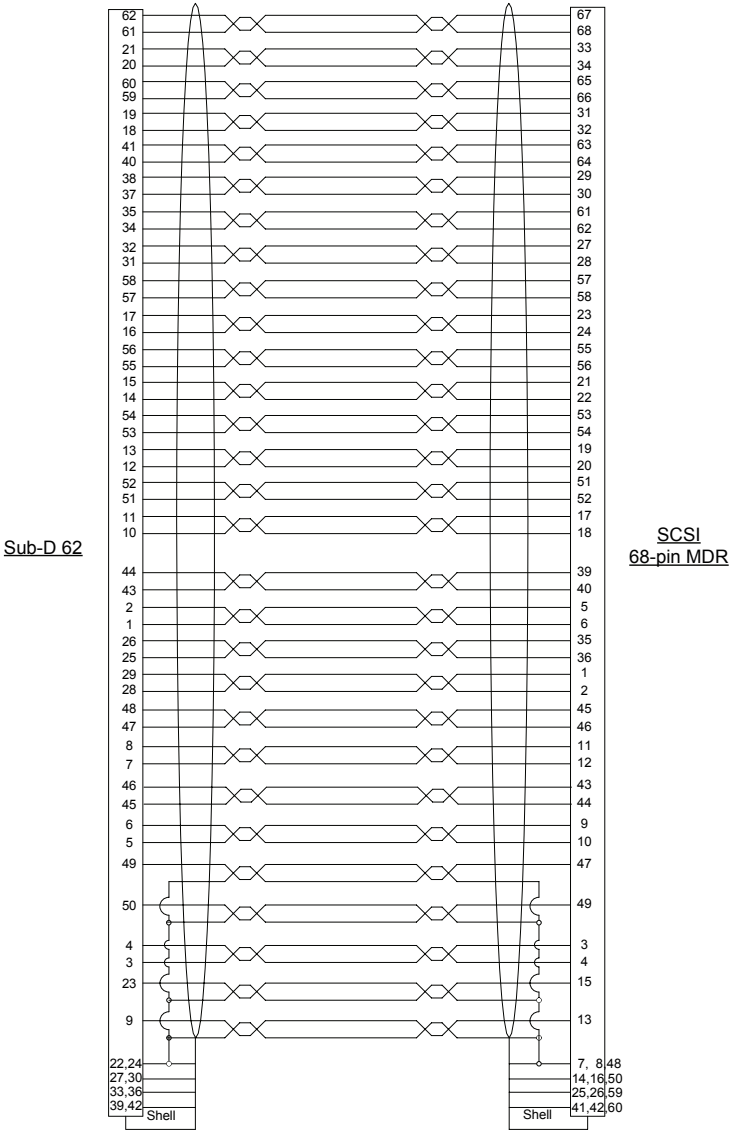


Use this adapter cable to connect the VX820e /VX822e cable with the card.

Connection cable VX820e/VX822e ⇔ BoB8



Sub-D 62⇔ SCSI 68 MDR wiring diagram



VX 820HR and VX822HR cable pinout

	Pin	Signal	Pin	Signal	Pin	Signal
Digital	1		22	GND	43	AES/EBU IN 1 -
	2		23	Vidéo IN	44	AES/EBU IN 1 +
	3	AES/EBU SYNC -	24	GND	45	AES/EBU OUT 3 -
	4	AES/EBU SYNC +	25		46	AES/EBU OUT 3 +
	5	AES/EBU OUT 4 -	26		47	AES/EBU OUT 1 -
	6	AES/EBU OUT 4 +	27	GND	48	AES/EBU OUT 1 +
	7	AES/EBU OUT 2 -	28		49	Word Clock IN
	8	AES/EBU OUT 2 +	29		50	Word Clock OUT
Analog	9	LTC IN	30	GND	51	OUT 7 -
	10	OUT 8 -	31		52	OUT 7+
	11	OUT 8 +	32		53	OUT 5 -
	12	OUT 6 -	33	GND	54	OUT 5 +
	13	OUT 6 +	34		55	OUT 3 -
	14	OUT 4 -	35		56	OUT 3 +
	15	OUT 4 +	36	GND	57	OUT 1 -
	16	OUT 2 -	37		58	OUT 1 +
	17	OUT 2 +	38		59	
	18		39	GND	60	
	19		40		61	IN 1 -
	20	IN 2 -	41		62	IN 1 +
	21	IN 2 +	42	GND		

VX820e and VX822e cable pinout

	Pin	Signal	Pin	Signal	Pin	Signal
Digital	1		11	AES/EBU OUT 2 +	41	GND
	2		12	AES/EBU OUT 2 -	42	GND
	3	AES/EBU SYNC +	15	Video IN	43	AES/EBU OUT 3 +
	4	AES/EBU SYNC -	16	GND	44	AES/EBU OUT 3 -
	5		35		45	AES/EBU OUT 1 +
	6		36		46	AES/EBU OUT 1 -
	7	GND	37	Reserved	47	Word Clock IN
	8	GND	38	Reserved	48	GND
	9	AES/EBU OUT 4 +	39	AES/EBU IN 1 +	49	Word Clock OUT
	10	AES/EBU OUT 4 -	40	AES/EBU IN 1 -	50	GND

	Pin	Signal	Pin	Signal	Pin	Signal
Analog	13	LTC IN	28		57	OUT 1 +
	14	GND	29		58	OUT 1 +
	17	OUT 8 +	30		59	GND
	18	OUT 8 -	31		60	GND
	19	OUT 6 +	32		61	
	20	OUT 6 -	33	IN 2 +	62	
	21	OUT 4 +	34	IN 2 -	63	
	22	OUT 4 -	51	OUT 7 +	64	
	23	OUT 2 +	52	OUT 7 -	65	
	24	OUT 2 -	53	OUT 5 +	66	
	25	GND	54	OUT 5 -	67	IN 1 +
	26	GND	55	OUT 3 +	68	IN 1 -
	27		56	OUT 3 -		